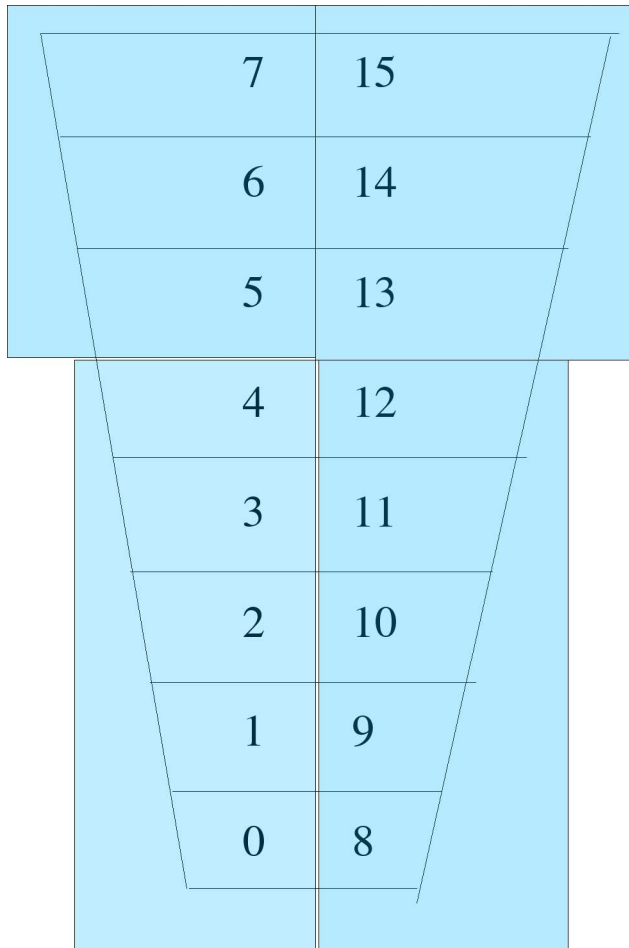Y

X

Panel 2
Panel 1
Panel 0

Look from collision vertex (Z=0) to North, we can see Endcaps in this way. Each has eight Octants and 24 Panels. I will number the panels from 0 to 23, starting from X-axis and going clockwise. Remember, the X-Y-Z is still right-hand.

7	15
6	14
5	13
4	12
3	11
2	10
1	9
0	8

Taking Endcap 0 as example, I will not consider the 4 detectors on it seperately, but digitize all (16) chips together. Number 0 starts from the one nearby the beam-pipe on left-column, and goes up to 7, then number 8 goes on from the one nearby the beam-pipe on right-column, and ends at 15.

Y

X

Beam Pipe
(X=Y=0)

255　　　　　511

0　　　　　256

Number of
Strip
increasing
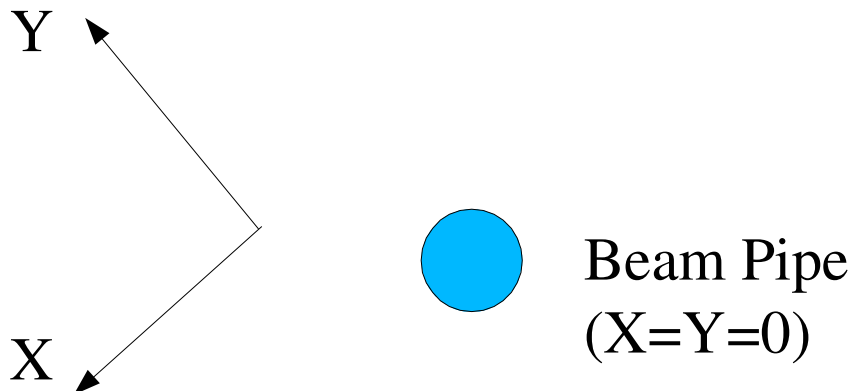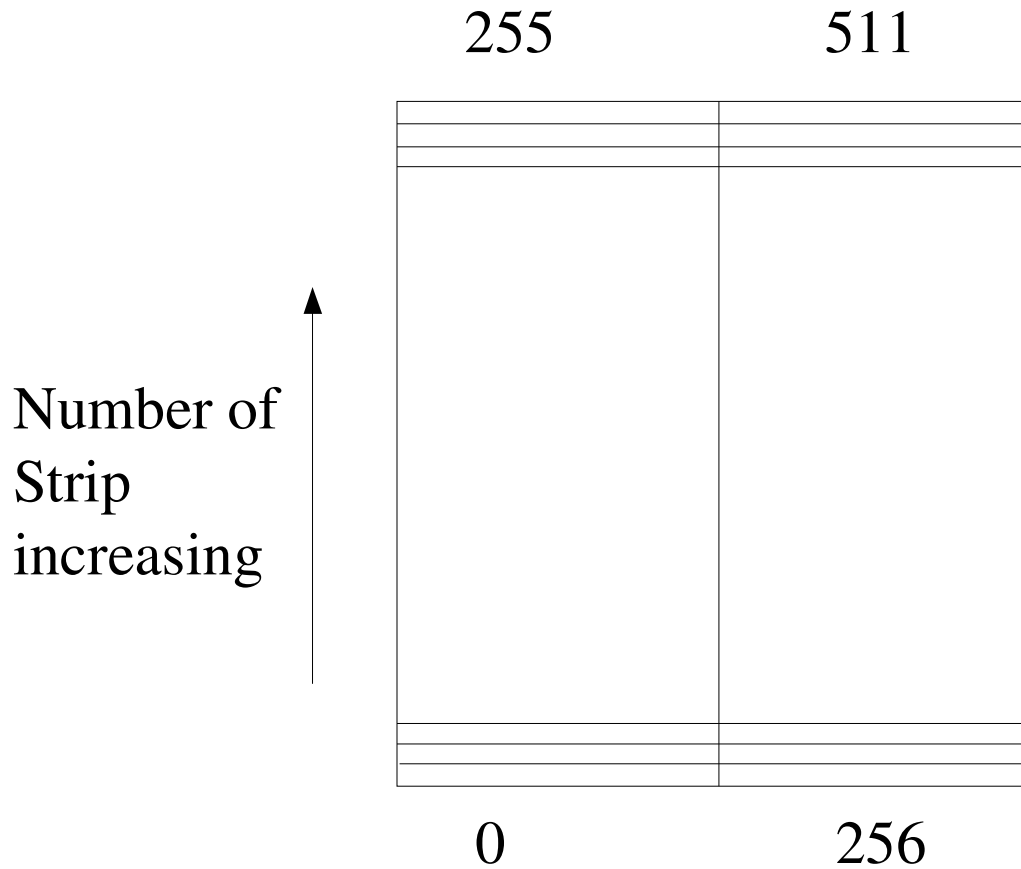
Then inside on one chip, I
digitize its 512 strips in
silimar way. Number 0
starts from left column,
the one nearby the beam-
pipe, and goes up to 255.
Then on the right-column,
256 starts at the one
nearby beam-pipe, goes
up and ends at 511.

Y

X

Beam Pipe
(X=Y=0)

n-1 2n-1 3n-1 4n-1
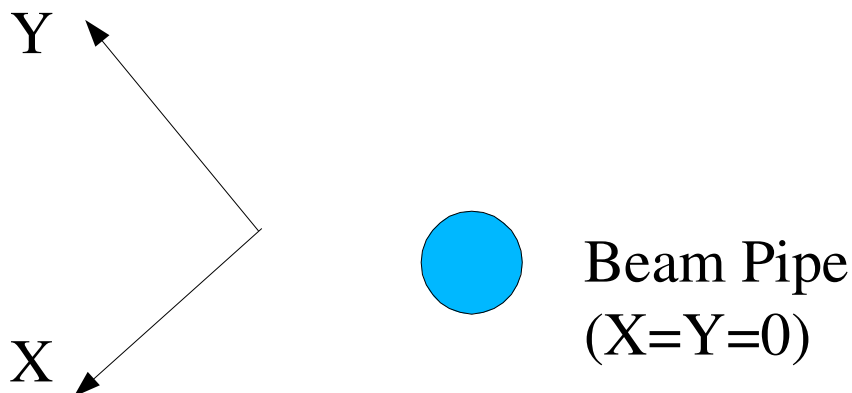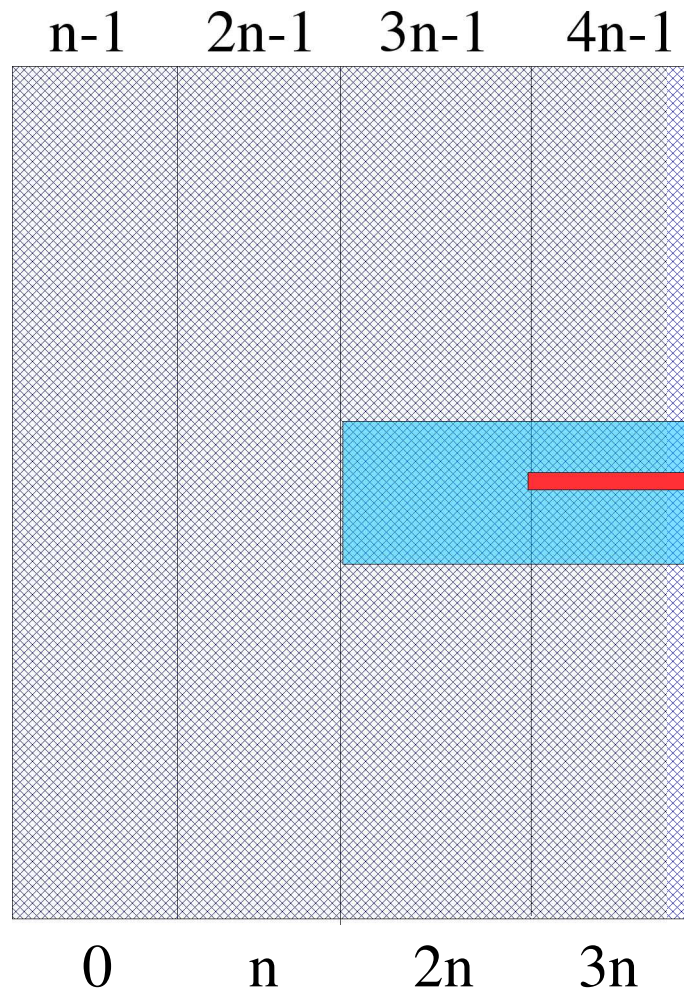
So, for station i=0, panel j=3 (grid), chip k=10 (blue), strip m=273 (red), what should be its position in the vector? As Nader required, the position should be numbered in the way left, suppose totally 4n for the 4 columns of strips.

0   n   2n   3n

Y

X
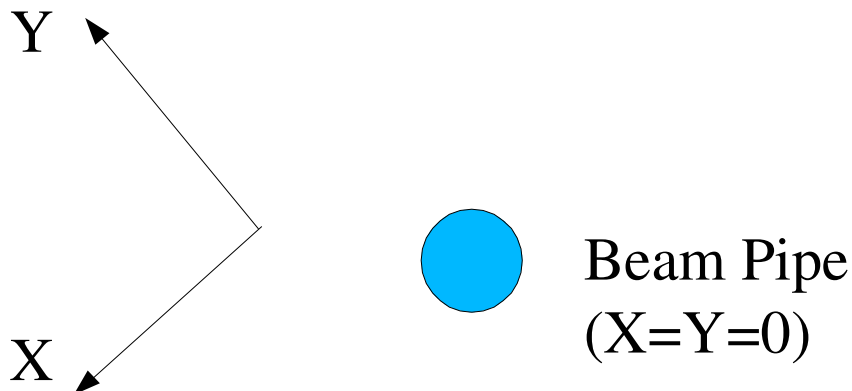
Beam Pipe
(X=Y=0)

Remember we always counts from bottom (near beam pipe).

Panels of Endcap 0 has 16 chips each. So each panel contain 16*512 strips, and the number of strips before Panel j=3 will be:
    $p1 = j*16*512 = 24576$.

Chip k=10>=8=16/2, so the strip is on right-side of Panel. Again strip m=273>=256, so strip is on right-side of chip.

Now we know strip must be on the 4th column. For the 3 columns of strips (halfchips) before it, each contains
    $n = (16/2=8$ halfchips$) * (512/2=256$ strips/halfchip$) = 2048$ strips.
    $p2 = 3*n = 6144$

There are k – 16/2 = 2 chip under chip k at the 4th column, so it brings another
    $p3 = 2$ halfchips $*256$ strips/halfchip $= 512$

And in its own chip, its own column, the strip m has a position of
    $p4 = m – 256 = 17$

So the position of this strip in vector should be:
    $p = p1 + p2 + p3 + p4 = 31249$

As for Station 1,2,3, we only need to change chip/panel from 16 to 22, and same algorithm.